

Weather Notes

Warm air rising is less dense and cools as it climbs. Air descending becomes denser due to compression and heats as it sinks (Santa Ana winds).

Every physical process of weather is accompanied by, or is the result of, a heat exchange.

Standard sea level pressure is 29.92" Hg and a temperature of 59° F. As altitude increases, pressure decreases. Every 1000' of altitude results in a decrease of 1" Hg. The air is less dense or thinner.

Density altitude. As the density of the air increases (lower density altitude), aircraft performance increases. Conversely, as air density decreases (higher density altitude), aircraft performance decreases. A decrease in air density means a high density altitude; an increase in air density means a lower density altitude. Density altitude has a direct effect on aircraft performance.

Temperature decreases about 2 degrees C (or 3.5 degrees F) per 1,000 feet of altitude above sea level. Also known as the lapse rate.

Stability of air depends on its ability to resist vertical movement. A stable atmosphere makes vertical movement difficult. Unstable air allows for more vertical movement and instability.

Cloud types: Cirrus, cumulus, stratus, castellanus, lenticular, cumulonimbus.

Clouds with extensive vertical development are cumulus clouds that build vertically into towering cumulus or cumulonimbus clouds. Towering cumulus clouds indicate areas of instability in the atmosphere, and the air around and inside them is turbulent. These types of clouds often develop into cumulonimbus clouds or thunderstorms.

Cumulonimbus clouds contain large amounts of moisture and unstable air and usually produce hazardous weather phenomena, such as lightning, hail, tornadoes, gusty winds, and wind shear. To pilots, the cumulonimbus cloud is the most dangerous cloud type. Downward speed may exceed 2,500 FPM.

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Unstable Air

Cumuliform clouds

Showery precipitation

Rough air (turbulence)

Good visibility, except in blowing obstructions

Stable Air

Stratiform clouds and fog

Continuous precipitation

Smooth air

Fair to poor visibility in haze and smoke

A good example is after a rain storm and the air is clear. It's the unstable air that makes it clear, not the rain.

Effect of Obstructions on Wind.